



UNITED STATES PATENT AND TRADEMARK OFFICE

UNITED STATES DEPARTMENT OF COMMERCE
United States Patent and Trademark Office
Address: COMMISSIONER FOR PATENTS
P.O. Box 1450
Alexandria, Virginia 22313-1450
www.uspto.gov

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/612,904	07/07/2003	Christopher Wargo	MR2799-10	4331
4586	7590	06/03/2005	EXAMINER	
ROSENBERG, KLEIN & LEE 3458 ELLICOTT CENTER DRIVE-SUITE 101 ELLICOTT CITY, MD 21043			CHAN, SING P	
			ART UNIT	PAPER NUMBER
			1734	
DATE MAILED: 06/03/2005				

Please find below and/or attached an Office communication concerning this application or proceeding.

VK

Office Action Summary	Application No. 10/612,904	Applicant(s) WARGO ET AL.	
	Examiner Sing P. Chan	Art Unit 1734	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☐ Responsive to communication(s) filed on _____.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-20 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1-20 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 07 July 2003 is/are: a) ☐ accepted or b) ☒ objected to by the Examiner.
 Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
 Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
 a) ☐ All b) ☐ Some * c) ☐ None of:
 1. ☐ Certified copies of the priority documents have been received.
 2. ☐ Certified copies of the priority documents have been received in Application No. _____.
 3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
 * See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- 1) ☒ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☒ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)
 Paper No(s)/Mail Date 2/12/04&3/24/04.
- 4) ☐ Interview Summary (PTO-413)
 Paper No(s)/Mail Date. _____.
- 5) ☐ Notice of Informal Patent Application (PTO-152)
- 6) ☐ Other: _____.

2

DETAILED ACTION

Drawings

1. The drawings are objected to under 37 CFR 1.83(a). The drawings must show every feature of the invention specified in the claims. However, the drawings do not correspond to the Specification and therefore, new draws must be submitted, which show the claimed features or the feature(s) canceled from the claim(s). No new matter should be entered.

Corrected drawing sheets in compliance with 37 CFR 1.121(d) are required in reply to the Office action to avoid abandonment of the application. Any amended replacement drawing sheet should include all of the figures appearing on the immediate prior version of the sheet, even if only one figure is being amended. The figure or figure number of an amended drawing should not be labeled as "amended." If a drawing figure is to be canceled, the appropriate figure must be removed from the replacement sheet, and where necessary, the remaining figures must be renumbered and appropriate changes made to the brief description of the several views of the drawings for consistency. Additional replacement sheets may be necessary to show the renumbering of the remaining figures. Each drawing sheet submitted after the filing date of an application must be labeled in the top margin as either "Replacement Sheet" or "New Sheet" pursuant to 37 CFR 1.121(d). If the changes are not accepted by the examiner, the applicant will be notified and informed of any required corrective action in the next Office action. The objection to the drawings will not be held in abeyance.

Claim Objections

2. Claims 2 and 12 are objected to under 37 CFR 1.75(c), as being of improper dependent form for failing to further limit the subject matter of a previous claim. Applicant is required to cancel the claim(s), or amend the claim(s) to place the claim(s) in proper dependent form, or rewrite the claim(s) in independent form. Claims 1 and 11 recited laser drilling the substrate to form at least one channel.
3. Claims 9 and 19 are objected to because of the following informalities: The claims recited, "substrate is a polyimide composition," which should be "substrate is a polyimide." Appropriate correction is required.

Claim Rejections - 35 USC § 112

4. The following is a quotation of the second paragraph of 35 U.S.C. 112:

The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.
5. Claims 1-20 are rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.
6. Claim 1 recites the limitation "said channel" in line 9. There is insufficient antecedent basis for this limitation in the claim. For the purpose of examination, "said at least one channel" will be assumed.
7. Claim 5 recites the limitation "said channel" in line 2. There is insufficient antecedent basis for this limitation in the claim. For the purpose of examination, "said at least one channel" will be assumed.

8. Claim 6 recites the limitation "said channel" in line 4-5. There is insufficient antecedent basis for this limitation in the claim. For the purpose of examination, "said at least one channel" will be assumed.
9. Claim 11 recites the limitation "said channel" in line 9. There is insufficient antecedent basis for this limitation in the claim. For the purpose of examination, "said at least one channel" will be assumed.
10. Claim 16 recites the limitation "said channel" in line 4-5. There is insufficient antecedent basis for this limitation in the claim. For the purpose of examination, "said at least one channel" will be assumed.

Claim Rejections - 35 USC § 103

11. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

12. Claims 1, 2, 7, and 10 are rejected under 35 U.S.C. 103(a) as being unpatentable over Koste et al (U.S. 3,956,052) in view of Mizuno et al (U.S. 5,466,325).

Koste et al discloses a method forming metal pattern on dielectric substrates. The method includes providing a dielectric substrate, laminating a thin organic layer, preferably MYLAR, (Col 4, lines 7-9) which is polyethylene teraphthalate polyester, i.e. a dielectric film (Col 4, lines 55-56), using either an electron beam or a laser as an energy beam source to form a plurality of holes and channels (Col 4, lines 44-54), depositing a wet metal material, i.e. conductive material, over the organic mask, i.e. the organic layer

Art Unit: 1734

to form metallized channel and interconnection holes by rolling, wiping, and doctor blading (Col 5, lines 17-22), stripping the organic mask by peeling to remove undesired metal (Col 5, lines 39-45), and then firing according to well known techniques (Col 5, lines 46-50). Koste et al is silent as to applying a release layer with adhesive coating to the upper surface of the dielectric film and removing the release layer and the dielectric film and exposing electrically conductive material on the upper surface of the substrate. However, adhering an adhesive tape onto the surface of a mask and peeling both the mask and the tape off the surface of the substrate is well known and conventional as shown for example by Mizuno et al. Mizuno et al discloses a method of removing a resist mask. The method includes providing a mask on a substrate (Col 2, lines 60-63), providing an adhesive tape with an acrylic adhesive coating (Col 5, lines 51-57), adhering the adhesive tape onto the mask (Col 2, line 65 to Col 3, line 5), and peeling both the tape and mask off the substrate (Col 3, lines 32-38).

It would have been obvious to one of ordinary skill in the art at the time the invention was made to provide an acrylic adhesive coated tape, adhering the tape onto the surface of a mask and peeling both the mask and the tape off the surface of the substrate as disclosed by Mizuno et al in the method of Koste et al to allow the mask to easily removing from the surface of the substrate. (Col 1, lines 65-67)

13. Claims 3 and 4 are rejected under 35 U.S.C. 103(a) as being unpatentable over Koste et al (U.S. 3,956,052) in view of Mizuno et al (U.S. 5,466,325) as applied to claim 1 above, and further in view of Zhao et al (U.S. 6,245,663).

Koste et al as modified above discloses the conductive material includes 83 percent of molybdenum. (Col 5, lines 19-26) Koste et al is silent as to the conductive material includes silver and copper. However, providing molybdenum, silver, and copper as the conductive material is well known and conventional as shown for example by Zhao et al. Zhao et al discloses using molybdenum, silver, or copper as the conductive material for the conductors, which are all equivalents. (Col 5, lines 23-31)

It would have been obvious to one of ordinary skill in the art at the time the invention was made to provide molybdenum, silver, or copper as the conductive material as disclosed by Zhao et al in the method of Koste et al as modified by Mizuno et al to provide any materials, which are all equivalents.

14. Claims 5 and 6 are rejected under 35 U.S.C. 103(a) as being unpatentable over Koste et al (U.S. 3,956,052) in view of Mizuno et al (U.S. 5,466,325) as applied to claim 1 above, and further in view of Hayama et al (U.S. 6,378,424).

Koste et al as modified above is silent as to heating the substrate, dielectric film, and conductive material and application of second layer of conductive material to the channel. However, heating the substrate and the conductive material and refilling the channel and additional heating is well known and conventional as shown for example by Hayama et al. Hayama et al discloses a method of fabricating electronics by printing. The method includes applying conductive paste to the intaglio plate with a release layer, filling the grooves or channels with a conductive material (Col 7, lines 26-32), drying the conductive material with hot air dryer, i.e. heating, refilling the groove and pit and redrying (Col 8, lines 28-39), which in combination with Koste et al, will require heating

Art Unit: 1734

the substrate, the dielectric film and the conductive material and leaving the film in place for the refill and redrying of the conductive material prior to peeling the film.

It would have been obvious to one of ordinary skill in the art at the time the invention was made to provide heat to dry the conductive material and refilling and redrying the material as disclosed by Hayama et al in the method of Koste et al as modified by Mizuno et al to form conductors in better shape and prevent cracking and disconnection. (Col 8, lines 14-19 and Col 8, lines 35-40)

15. Claims 8 and 9 are rejected under 35 U.S.C. 103(a) as being unpatentable over Koste et al (U.S. 3,956,052) in view of Mizuno et al (U.S. 5,466,325) as applied to claim 1 above, and further in view of Schreiber et al (U.S. 5,233,157).

Koste et al as modified above is silent as to the laser is an ultraviolet laser and the dielectric substrate is a polyimide. However, providing an ultraviolet laser for cutting the channels or pattern and providing a dielectric substrate with a polyimide composition is well known and conventional as shown for example by Schreiber et al. Schreiber et al discloses a method of laser ablating circuitry master. The method includes using an excimer laser with laser pluses of a 248 nm wavelength, i.e. ultraviolet range, which is capable of cutting channels with a width as small as one-half mil (Col 3, lines 20-35) and providing a dielectric substrate form of well known material such as polyimide, acrylic adhesive, polyethylene, polyester, and vinyl, which are all equivalents. (Col 5, lines 8-17)

It would have been obvious to one of ordinary skill in the art at the time the invention was made to provide an ultraviolet laser for cutting the channels or pattern

Art Unit: 1734

and providing dielectric substrate of well known material such as polyimide as disclosed by Schreiber et al in the method of Koste et al as modified by Mizuno et al to provide a means for cutting fine grooves or channels to form the desired circuit (Col 2, lines 38-45) and providing any materials for the dielectric substrate, which are all equivalents.

16. Claims 11, 12, 16, 17, and 20 are rejected under 35 U.S.C. 103(a) as being unpatentable over Koste et al (U.S. 3,956,052) in view of Mizuno et al (U.S. 5,466,325) and Hayama et al (U.S. 6,378,424).

Koste et al discloses a method forming metal pattern on dielectric substrates. The method includes providing a dielectric substrate, laminating a thin organic layer, preferably MYLAR, (Col 4, lines 7-9) which is polyethylene terephthalate polyester, i.e. a dielectric film (Col 4, lines 55-56), using either an electron beam or a laser as an energy beam source to form a plurality of holes and channels (Col 4, lines 44-54), depositing a wet metal material, i.e. conductive material, over the organic mask, i.e. the organic layer to form metallized channel and interconnection holes by rolling, wiping, and doctor blading (Col 5, lines 17-22), stripping the organic mask by peeling to remove undesired metal (Col 5, lines 39-45), and then firing according to well known techniques (Col 5, lines 46-50). Koste et al is silent as to applying a release layer with adhesive coating to the upper surface of the dielectric film and removing the release layer and the dielectric film, exposing electrically conductive material on the upper surface of the substrate, heating the substrate, dielectric film, and conductive material and application of second layer of conductive material to the channel. However, adhering an adhesive tape onto the surface of a mask and peeling both the mask and the tape off the surface of the

Art Unit: 1734

substrate is well known and conventional as shown for example by Mizuno et al.

Mizuno et al discloses a method of removing a resist mask. The method includes providing a mask on a substrate (Col 2, lines 60-63), providing an adhesive tape with an acrylic adhesive coating (Col 5, lines 51-57), adhering the adhesive tape onto the mask (Col 2, line 65 to Col 3, line 5), and peeling both the tape and mask off the substrate (Col 3, lines 32-38).

It would have been obvious to one of ordinary skill in the art at the time the invention was made to provide an acrylic adhesive coated tape, adhering the tape onto the surface of a mask and peeling both the mask and the tape off the surface of the substrate as disclosed by Mizuno et al in the method of Koste et al to allow the mask to easily removing from the surface of the substrate. (Col 1, lines 65-67) Koste et al as modified by Mizuno et al is silent as to heating the substrate, dielectric film, and conductive material and application of second layer of conductive material to the channel. However, heating the substrate and the conductive material and refilling the channel and additional heating is well known and conventional as shown for example by Hayama et al. Hayama et al discloses a method of fabricating electronic by printing. The method includes applying conductive paste to the intaglio plate with a release layer, filling the grooves or channels with conductive material (Col 7, lines 26-32), drying the conductive material with hot air dryer, i.e. heating, refilling the groove and pit and redrying (Col 8, lines 28-39), which in combination with Koste et al, will requires heating the substrate, the dielectric film and the conductive material and leaving the film in place for the refill and redrying of the conductive material prior to peeling the film.

It would have been obvious to one of ordinary skill in the art at the time the invention was made to provide heat and dry the conductive material and refilling and redrying the material as disclosed by Hayama et al in the method of Koste et al as modified by Mizuno et al to form conductors in better shape and prevent cracking and disconnection. (Col 8, lines 14-19 and Col 8, lines 35-40)

17. Claims 13 and 14 are rejected under 35 U.S.C. 103(a) as being unpatentable over Koste et al (U.S. 3,956,052) in view of Mizuno et al (U.S. 5,466,325) and Hayama et al (U.S. 6,378,424) as applied to claim 11 above, and further in view of Zhao et al (U.S. 6,245,663).

Koste et al as modified above discloses the conductive material includes 83 percent of molybdenum. (Col 5, lines 19-26) Koste et al is silent as to the conductive material includes silver and copper. However, providing molybdenum, silver, and copper as the conductive material is well known and conventional as shown for example by Zhao et al. Zhao et al discloses using molybdenum, silver, or copper as the conductive material for the conductors, which are all equivalents. (Col 5, lines 23-31)

It would have been obvious to one of ordinary skill in the art at the time the invention was made to provide molybdenum, silver, or copper as the conductive material as disclosed by Zhao et al in the method of Koste et al as modified by the combination of references to provide any materials, which are all equivalents.

18. Claim 15 is rejected under 35 U.S.C. 103(a) as being unpatentable over Koste et al (U.S. 3,956,052) in view of Mizuno et al (U.S. 5,466,325) and Hayama et al (U.S. 6,378,424) as applied to claim 11 above, and further in view of Ellis (U.S. 3,923,697).

Koste et al as modified above is silent as to heating or drying the conductive material, the dielectric film, and substrate by radiant heat transfer. However, using radiant to heat or dry the conductive material is well known and conventional as shown for example by Ellis. Ellis discloses a method of forming electrically conductive connection. The method includes heating the substrate and the conductive film in an oven and subject to hot air, convention heating, or infrared radiant heat or cured by microwave radiation, which are all equivalents. (Col 16, lines 52-64)

It would have been obvious to one of ordinary skill in the art at the time the invention was made to heat the substrate and the conductive film in an oven and subject to hot air, convention heating, or infrared radiant heat or cured by microwave radiation as disclosed by Ellis in the method of Koste et al as modified by the combination of references to provide any means, which are all equivalents.

19. Claims 18 and 19 are rejected under 35 U.S.C. 103(a) as being unpatentable over Koste et al (U.S. 3,956,052) in view of Mizuno et al (U.S. 5,466,325) and Hayama et al (U.S. 6,378,424) as applied to claim 11 above, and further in view of Schreiber et al (U.S. 5,233,157).

Koste et al as modified above is silent as to the laser is an ultraviolet laser and the dielectric substrate is a polyimide. However, providing an ultraviolet laser for cutting the channels or pattern and providing a dielectric substrate with a polyimide composition is well known and conventional as shown for example by Schreiber et al. Schreiber et al discloses a method of laser ablating circuitry master. The method includes using an excimer laser with laser pluses of a 248 nm wavelength, i.e. ultraviolet range, which is

Art Unit: 1734

capable of cutting channels with a width as small as one-half mil (Col 3, lines 20-35) and providing a dielectric substrate form of well known material such as polyimide, acrylic adhesive, polyethylene, polyester, and vinyl, which are all equivalents. (Col 5, lines 8-17)

It would have been obvious to one of ordinary skill in the art at the time the invention was made to provide an ultraviolet laser for cutting the channels or pattern and providing dielectric substrate of well known material such as polyimide as disclosed by Schreiber et al in the method of Koste et al as modified by the combination of references to provide a means for cutting fine grooves or channels to form the desired circuit (Col 2, lines 38-45) and providing any materials for the dielectric substrate, which are all equivalents.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Sing P. Chan whose telephone number is 571-272-1225. The examiner can normally be reached on Monday-Friday 7:30AM-11:00AM and 12:00PM-4:00PM.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Christopher A. Fiorilla can be reached on 571-272-1187. The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306.

Art Unit: 1734

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

Chan Sing Po

spc

[Signature]
CURTIS MAYES
PRIMARY EXAMINER